--13. An auxiliary anode element which can be inserted into a bent tubular workpiece for electroplating an inner peripheral surface of the workpiece, said auxiliary anode element comprising:

a flexible metal wire connectable to a primary anode element, said flexible metal wire comprising a strand of thin stainless steel wires and a connecting terminal on a first end of said strand of thin stainless steel wires; and

a spacer, attached to said metal wire, for preventing said metal wire from contacting the inner peripheral surface of the workpiece, said spacer being formed of an insulating material.

14. An auxiliary anode element as claimed in claim 13, wherein said spacer comprises a tube having a plurality of liquid penetrating holes, said tube surrounding said flexible metal wire.

15. An auxiliary anode element as claimed in claim 13, wherein said spacer comprises a helical coil.

16. An auxiliary anode element as claimed in claim 13, further comprising a plurality of said spacers, wherein each of said spacers is formed of plastic and includes a plurality of annular plates secured on a periphery of said metal wire and a plurality of framed plates formed integrally with said annular



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plates so as to extend axially with respect to said metal wire to thereby connect said annular plates together.

5 4
~~17~~. An auxiliary anode element as claimed in claim ~~16~~, wherein said annular plates of each said spacer comprise a first annular plate disposed at a first axial end of said spacer, a second annular plate disposed at a second axial end of said spacer, and a third annular plate disposed at a center of said spacer, said third annular plate having a diameter which is larger than a diameter of said first and second annular plates.

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~~18~~. An auxiliary anode element as claimed in claim ~~13~~, B further comprising a cylindrical member secured on a second end of A1 said strand to hold together said stainless steel wires.

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~~19~~. An auxiliary anode element capable of insertion into a tubular workpiece for electroplating an inner peripheral surface of the workpiece, said auxiliary anode element comprising:

a spacer tube formed of an insulating material and having a plurality of liquid penetrating openings; and

a flexible metal wire inserted in said spacer tube, said B flexible metal wire being connectable to a primary anode element,

wherein said spacer tube prevents said metal wire from contacting the inner peripheral surface of the workpiece.



A 19

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20. An auxiliary anode element which can be inserted into a tubular workpiece for electroplating an inner peripheral surface of the workpiece, said auxiliary anode element comprising:

a flexible metal wire connectable to a primary anode element; and

a plurality of plastic spacers attached to said metal wire for preventing said metal wire from contacting the inner surface of the workpiece, each of said spacers including a plurality of annular plates secured to a periphery of said metal wire and a plurality of framed plates formed integrally with said annular plates so as to extend axially with respect to said metal wire to thereby connect said annular plates together.

G1

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21. An auxiliary anode element as claimed in claim 20, wherein said annular plates of each said spacer comprise a first annular plate disposed at a first axial end of said spacer, a second annular plate disposed at a second axial end of said spacer, and a third annular plate disposed at a center of said spacer, and said third annular plate has a diameter which is larger than a diameter of said first and second annular plates.--

**In the Abstract:**

**Kindly replace the original abstract with the enclosed substitute abstract.**



A 20

## R E M A R K S

The Office Action of October 1, 1999 and the references cited therein have been carefully reviewed, and in view of the foregoing amendments and following representations, reconsideration is respectfully requested.

Initially, to facilitate the Examiner's reconsideration of the application, the specification and abstract have been reviewed and revised in order to make a number of minor clarifying and other editorial amendments. No new matter has been added.

Next, on page 2 of the Office Action, claims 1-12 are rejected under 35 U.S.C. § 112, second paragraph. Accordingly, claims 1-12 have been canceled and replaced with new claims 13-21. Each of the new claims has been carefully drafted to ensure compliance with the requirements of 35 U.S.C. § 112, second paragraph. In particular, the objection raised with respect to method claim 1 is now rendered moot because the new claims do not include any claims directed to the method. Also, the language considered by the Examiner to be unclear in claims 3 and 5 is not used in any of the new claims. In view of the above, it is submitted that the rejection under 35 U.S.C. 112, second paragraph is now clearly obviated.

* * * * *

In the previous Office action claims 5, 7-9, and 11-12 were indicated as being allowable if rewritten to overcome the rejection under 35 U.S.C. 112, second paragraph and to include all of the



limitations of the base claim and any intervening claims. Accordingly, new independent claims 19 and 20 correspond to original claims 5 and 7, respectively. Thus, claims 19-21 are clearly allowable. Also note that new claims 14 and 16-17 correspond to allowable original claims 9 and 11-12, respectively.

* * * * *

Note, new independent claim 13 generally corresponds to original claim 4 rewritten in independent form. Thus, the relevant rejection is the rejection of claims 4 and 10 under 35 U.S.C. 103 as being unpatentable over Lichtenberger et al. (U.S. Patent No. 4,786,390) in view of Haynes (U.S. Patent No. 3,804,725) and further in view of Kooijmans et al. (U.S. Patent No. 4,738,995), Michaut et al. (U.S. Patent No. 5,544,209) and Rogoff (U.S. Patent No. 2,329,653). This rejection is respectfully traversed for the following reasons.

New independent claim 13 is direct to an auxiliary anode element which can be inserted into a bent tubular workpiece for electroplating an inner surface thereof. The auxiliary anode element includes a flexible metal wire which is formed of a strand of thin stainless steel wires and a spacer for preventing the metal wire from contacting the inner peripheral surface of the workpiece.

**Lichtenberger**, as described by the Examiner, teaches that the interior surface of a tube can be plated by means of a wire anode which is concentric with the tube. Lichtenberger, however, lacks

any teaching of a flexible wire or the necessary spacer for use in electroplating bent tubular workpieces.

**Haynes** is applied by the Examiner to teach the use of a dielectric spacer 14 which is in the form of a spiral helix. The prior art spacer shown in Haynes is applied in a straight tube for electroplating the inner peripheral surface of the tube. In the Haynes arrangement, the tube is filled with an electrolyte and is rotated relative to the anode and to the helical spacer during application of electroplating current. Clearly, as with the Lichtenberger reference, Haynes is not directed to electroplating the inner peripheral surface of a bent tubular member, and lacks any disclosure of a flexible metal wire formed of a strand of thin stainless steel wires.

**Kooijmans** is applied by the Examiner for its teaching that stainless steel is a material which is suitable for use as an anode when coating the interior of a can. However, Kooijmans lacks any disclosure of a flexible metal wire formed of strand of thin stainless steel wires for use in coating a bent tubular workpiece.

**Michaut** is applied by the Examiner for its disclosure of a multi strand cable. Initially, Applicants concede that multistrand cables per se are known in the prior art. However, element 32, referenced by the Examiner, is not a flexible metal wire formed of a strand of thin stainless steel wires. Nor is the element 32 used in electroplating an inner peripheral surface of a

bent tubular workpiece. In particular, element 32 (Fig. 5) is an assembly of supply cables and conduits including a cable for supplying electric power to the electrode, conduits for supplying pressurized nitrogen and conduits for supplying and circulating electrolyte liquid. Clearly, the assembly disclosed in Michaut can not be read on the multistrand of stainless steel wires recited in claim 13.

Finally, **Rogoff** is applied by the Examiner for its teaching of a wire connector provided on an end of a wire. Claim 13 of the present invention requires a connecting terminal on a first end of the strand of thin stainless steel wires. Rogoff, however, is directed to a wire splicing sleeve (10). Clearly, the Rogoff wire splice does not read on the claimed connecting terminal provided on a first end of the strand of thin stainless steel wires. Further, it is unclear what motivation there would be to provide such a connector in the proposed combination of Lichtenberger, Haynes, Kooijmans and Michaut. In any event, Rogoff clearly does not teach or suggest a flexible metal wire comprising a strand of thin stainless steel wires and a connecting terminal provided on a first end of the strand. Nor is there any suggestion to use such an arrangement in electroplating an inner surface of a bent tubular workpiece.

In view of the above, it is submitted that the collective teachings of the various prior art references do not disclose or

suggest each and every limitation of independent claim 13. Accordingly, it submitted that new claims 13-21 are clearly allowable over the prior art of record.

In view of the above, it is submitted that the present application is now clearly in condition for allowance. The Examiner therefore is requested to pass this case to issue.

In the event that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for allowance, then the Examiner is requested to contact Applicant's undersigned attorney by telephone to promptly resolve any remaining matters.

Respectfully submitted,

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